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Suggested Title of Session in
which paper should be placed:

High Energy Colliders or
Beam Instabilities

Estimate of Collective Effects for an Asymmetric B-Factor Based on PEP, M.S. ZISMAN, S. CHATTOPADHYAY and Y.H. CHIN, Lawrence Berkeley Laboratory*—There is great interest worldwide in the design of high-luminosity e^+e^- colliders to serve as B-meson factories. An asymmetric collider, operating with different beam energies in its two intersecting storage rings, produces B-mesons moving in the laboratory system, thus facilitating the observation of CP violation. In practice, high luminosity requires high beam currents, on the order of 1 A, in each ring. It is thus important to estimate the various intensity-dependent effects that influence beam stability and lifetime. Topics considered include single-bunch thresholds (both longitudinal and transverse), coupled-bunch instabilities, and beam lifetime from Touschek and gas scattering. As an example, we consider a collider in the PEP tunnel operating at the $\Upsilon(4S)$ resonance ($3.1 \text{ GeV } e^+ \times 9 \text{ GeV } e^-$). The most severe performance limitation comes from coupled-bunch instabilities driven by the high-Q parasitic modes in the RF cavities. Impedance limitations derived from these considerations will be discussed, along with implications for the design of RF, feedback and vacuum systems.

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